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Perspectives of gamma-jet correlation analysis in Run2 in ALICE

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The ALICE experiment is dedicated to studies of the quark-gluon plasma (QGP) state, which is created in heavy ion collisions. Both photons and jets are excellent probes of QGP. Photons are produced during the different stages of the expansion of the initial hot matter fireball. They do not interact strongly with the medium and passing through it, they carry information on the properties of the matter at the space-time point of their emission. The direct photons are formed at the early stage of the collision in two processes: annihilation ($q\bar{q} \rightarrow g\gamma$) and Compton scattering ($qg \rightarrow q\gamma$). They enable a test of perturbative QCD constraining parton distributions and fragmentation functions. Moreover, they estimate the energy of correlated back-to-back jet.

A parton formed in the hard scattering at the early stage of the collision lose the energy when traversing the hot and dense matter and then fragments into a spray of particles called jet. Modification of the jet structure in medium compared to vacuum can provide hints to the properties of QGP.

Both direct photons and jets have been measured by the ALICE experiment at LHC. However, back-to-back correlation between photon and reconstructed jet in the ALICE experiment can be observed only with large statistics available in Run 2 due to the relatively small cross-section. Both the algorithm of selection of correlated gamma-jet events and prediction of the expected yield will be shown for both systems *pp*, Pb-Pb and p-Pb for available at LHC energies $\sqrt{s_{NN}}$ = 13 TeV, 5 TeV and 5.02 TeV, respectively. Additionally, transverse momentum ratio and fragmentation function of jets for binary collisions will be shown. Photons are measured in ALICE directly in the two electro-magnetic calorimeters (PHOS, EMCal). Jets are clusterised from charged tracks reconstructed in the central tracking detectors (TPC and ITS) and neutral constituents reconstructed in EMCal and PHOS.

On behalf of collaboration:

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